

# **Climate Action Team Economics Subgroup Public Workshop**

Updated Strategies

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# Overview

- ❑ Objectives
- ❑ Approach
- ❑ Standardized Data Collection
- ❑ Common Methodologies
- ❑ Results

# Objectives

- ❑ Update the Climate Strategies in the 2006 Climate Action Team Report:
  - ❑ Ensure consistent methods for estimating emissions, costs, savings.
  - ❑ Identify and address potential double counting.
  - ❑ Identify and address co-benefits.
  - ❑ Provide documentation and transparency.



# Approach

- ❑ Standardize the information collected for each strategy.
- ❑ Document the data reported for each strategy.
- ❑ Apply consistent methods across all strategies to calculate:
  - ❑ Emissions, costs, savings, co-benefits.
- ❑ Address potential double counting.

# Standardized Data

1. Strategy Name
2. Responsible Agency
3. Strategy Description, including: Overview Affected Entities Related Objectives (whether the strategy achieves objectives other than the reduction of greenhouse gas emissions) Strategy Metrics (how to measure progress) Strategy Goals and Implementation Approach
4. Technology (description of the technology used to reduce emissions)
5. Statutory Status
6. Implementation Steps and Timeline
7. Greenhouse Gas Emission Reductions
8. Costs and Savings
9. Other Benefits (additional benefits expected, including non-monetized or un-quantified benefits)

# Standardized Data (Continued)

- ❑ Costs:
  - ❑ Capital costs in appropriate years.
  - ❑ Operating costs in appropriate years.
  - ❑ Total costs by all affected parties.
- ❑ Savings:
  - ❑ Fuel/electricity savings.
  - ❑ Operating/material savings.

# Standardized Data (Continued)

- ❑ Fuel/Electricity Impacts:
  - ❑ All impacts reported in energy units in the years in which they are realized:
    - ❑ MWh
    - ❑ MMBtus
    - ❑ Gallons
  - ❑ Differentiate among:
    - ❑ Avoided energy consumption
    - ❑ Increased (renewable) energy production



# Standardized Data (Continued)

- ❑ Emissions Impacts:
  - ❑ All emissions impacts estimated for the specific years in which they occur.
  - ❑ All emissions impacts from energy estimated with a common set of factors.
  - ❑ All process-specific emissions impacts estimated on a strategy-specific basis.



# Documentation

## ☐ Results:

- ☐ Updated strategy write ups presented in Attachment B for 26 strategies.
- ☐ 14 strategies were not updated:
  - ☐ 2 were already implemented or achieved
  - ☐ 4 fuels strategies and the cement strategy undergoing significant revision (not completed for this analysis)
  - ☐ 4 strategies were not ready to be characterized (did not have estimates in the CAT Report)
  - ☐ 3 strategies did not have adequate data for updating

# Documentation (Continued)

## ☐ Results:

- ☐ The updated strategy write ups are more complete with better documentation.
- ☐ Not yet perfect.
- ☐ Many strategies continue to evolve and improve – this is not the final specification for the strategies.
- ☐ Many new strategies are under development: we did not capture some of the Early Action strategies, such as Low Carbon Fuel Standard.

# Consistent Methods

- ☐ Emissions.
- ☐ Energy Prices.
- ☐ Double Counting.
- ☐ Costs and Savings.



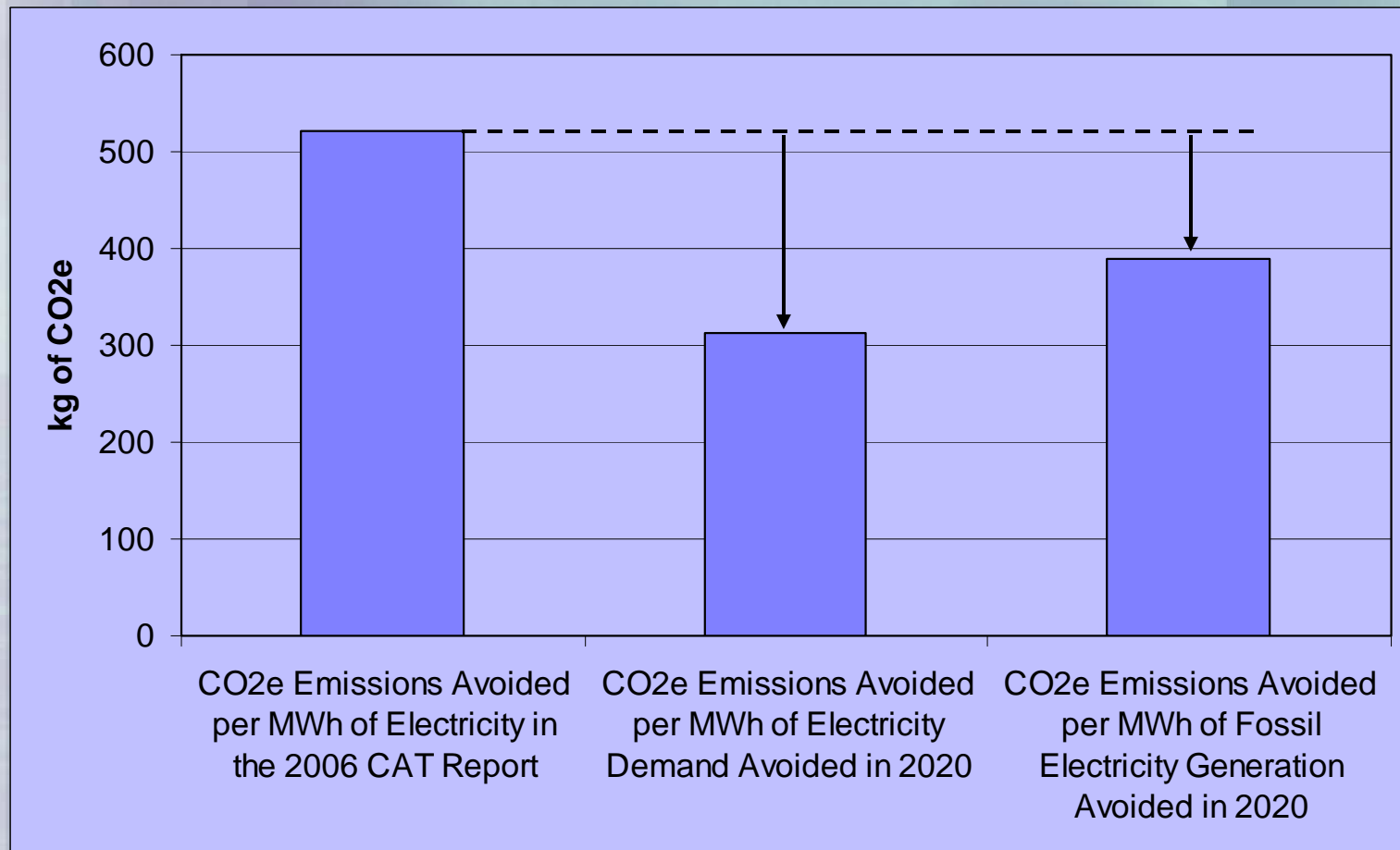
# Consistent Methods: Emissions

- ❑ Focus on energy:
  - ❑ Natural gas combustion
  - ❑ Gasoline combustion
  - ❑ Diesel fuel combustion
  - ❑ Electricity: Required extra focus
- ❑ Process-specific emissions addressed in each strategy.

# Consistent Methods: Electricity

- ❑ Need to consider:
  - ❑ Generating assets available over time – reflecting new capacity additions
  - ❑ Use of available generating assets
- ❑ Detailed modeling tools under development but not available for this Report.
- ❑ Simplified approach with a focus on 2020
  - ❑ Focus on avoided new capacity: both fossil and renewable

# Consistent Methods: Electricity Emissions Factors





# Consistent Methods: Electricity

- ❑ Steps toward improvement:
  - ❑ Modeling tools under development
  - ❑ Examine a range of technology assumptions

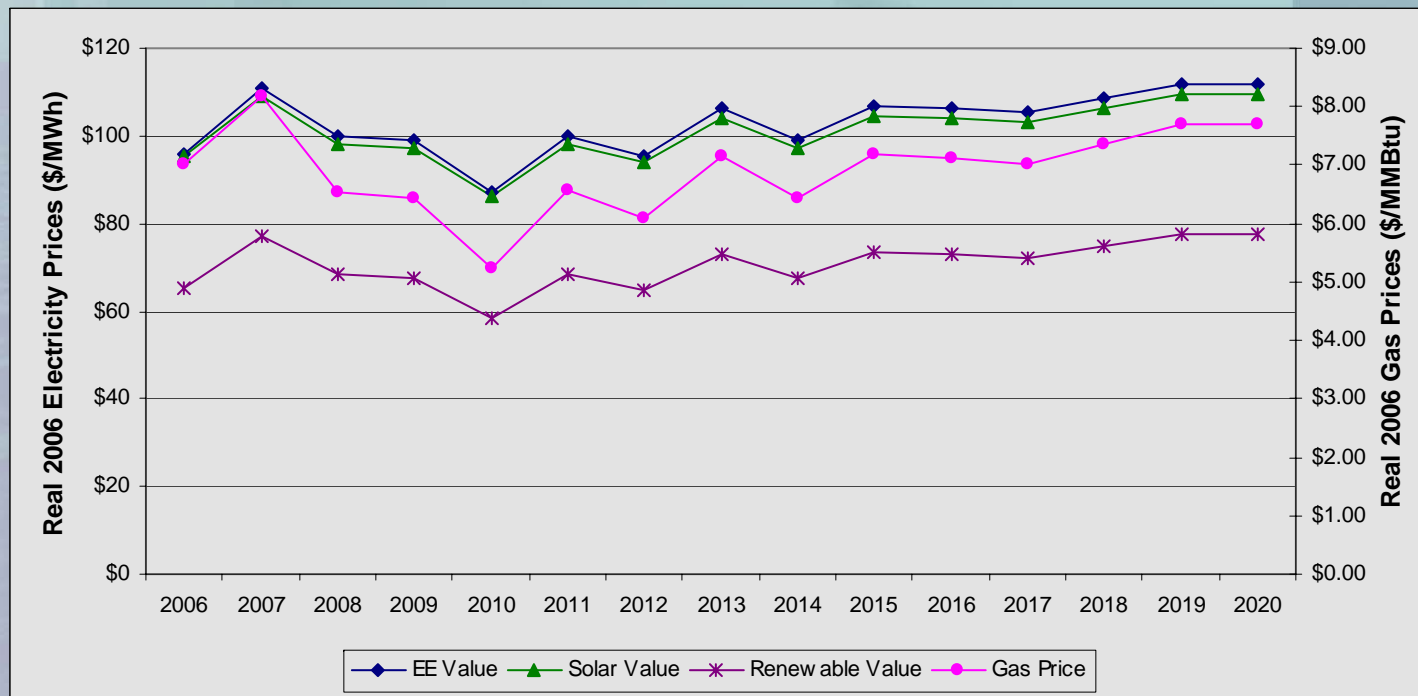
# Consistent Methods: Energy Prices

- ❑ Focus on energy:
  - ❑ Natural gas
  - ❑ Gasoline
  - ❑ Diesel Fuel
  - ❑ Electricity
- ❑ Remain Consistent with the 2006 CAT Report:
  - ❑ Emissions and economic baseline
  - ❑ 2005 IEPR for fuels

# Consistent Methods: Energy Prices

## ❑ Electricity:

- ❑ Avoided cost model: 8,760 hours
- ❑ Natural gas price forecasts

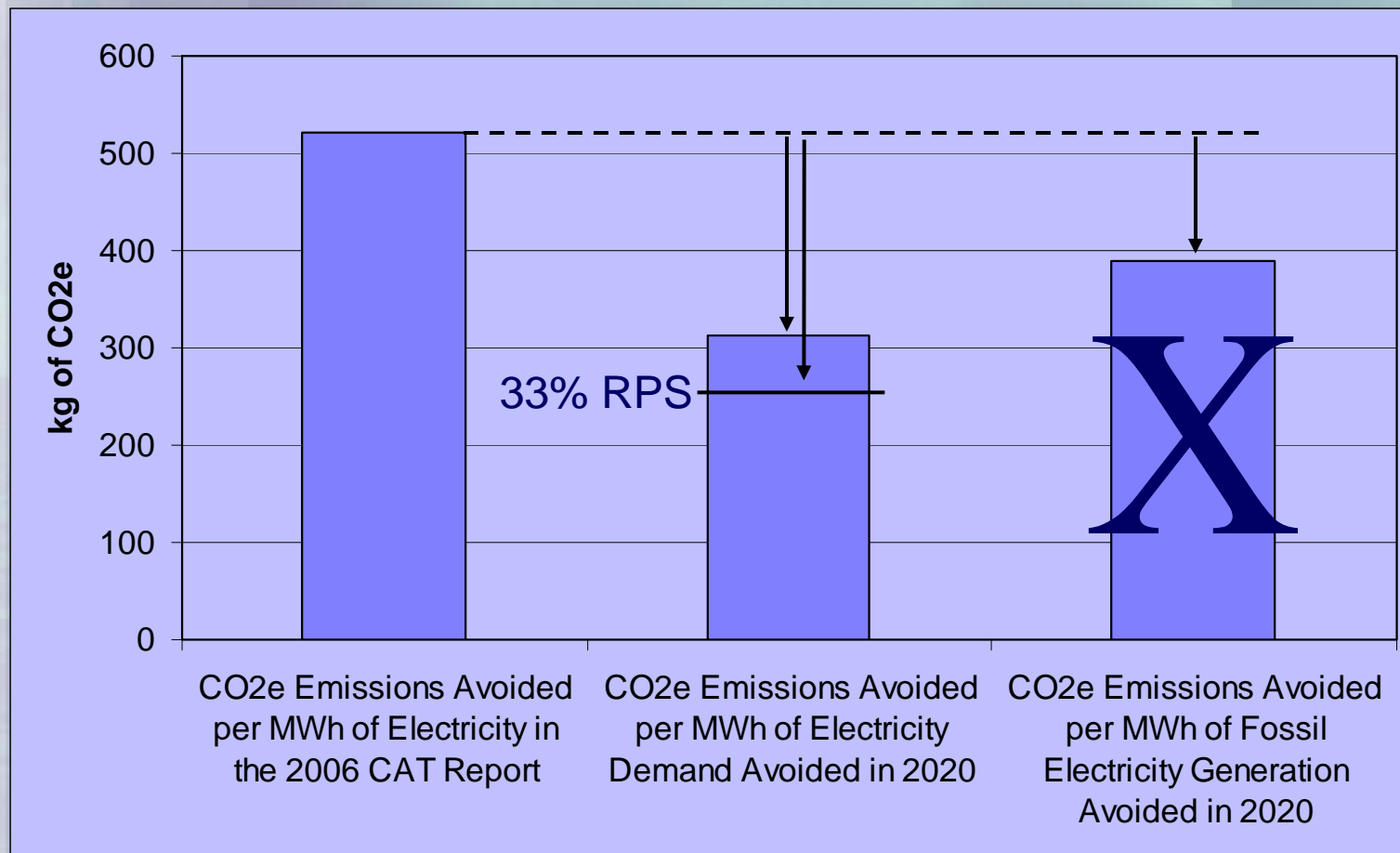




# Consistent Methods: Double Counting

- ❑ Interaction among strategies:
  - ❑ Renewable power generation and the RPS
  - ❑ 33% RPS and avoided electricity demand
  - ❑ LCFS and transportation strategies

# Consistent Methods: Double Counting



# Consistent Methods: Costs & Savings

- ❑ Objective: Include all costs and savings.
- ❑ Reality: Include all that we can estimate:
  - ❑ Costs: Capital, operating
  - ❑ Savings: Fuel savings
- ❑ Not fully reported:
  - ❑ Value of some co-benefits
  - ❑ Regulatory administrative costs



# Consistent Methods: Costs & Savings

- ❑ Count costs and savings in the years the occur.
- ❑ Capital Costs:
  - ❑ Report in specific years
  - ❑ “Levelize” across lifetime and emission reduction (5% discount rate)
  - ❑ Constant emission reduction
  - ❑ Varying emission reduction

# Consistent Methods: Costs & Savings

- ❑ Criteria Air Pollutants:
  - ❑ Emissions impact in tons per year
  - ❑ Value of emissions avoided using \$/ton
  - ❑ Used when comparing net costs across strategies
  - ❑ Not used in the macroeconomic modeling

# Results

- ❑ Changes vary among strategies.
- ❑ Summary results for each strategy are presented in Attachment A:
  - ❑ Compare new estimates to previous estimates
  - ❑ Brief explanation of the factors that changed



# Results (Continued)

<b>Strategy: Building Energy Efficiency Standards (In Place)</b>			
Agency: CEC			
	<b>Estimates for 2020</b>		
	<b>Emission Reduction (MMT CO<sub>2</sub>e)</b>	<b>Costs (Million 2006 \$)</b>	<b>Savings (Million 2006 \$)</b>
<b>March 2006 Estimates</b>	2.00	\$176	\$422
<b>August 2007 Updated Estimates</b>	2.14	\$255	\$658
<p>Major Changes:</p> <p>Improved characterization of energy reductions in 2020 due to the standards that take into account the persistence of the measures over many decades. Updated emissions factors and energy prices applied to all strategies are incorporated.</p> <p>Updated cost estimate includes approximately \$3.5 billion of capital costs (2006 dollars) levelized using a 5% discount rate over the life of the building (30 years for residential and 15 years for commercial).</p>			

# Results (Continued)

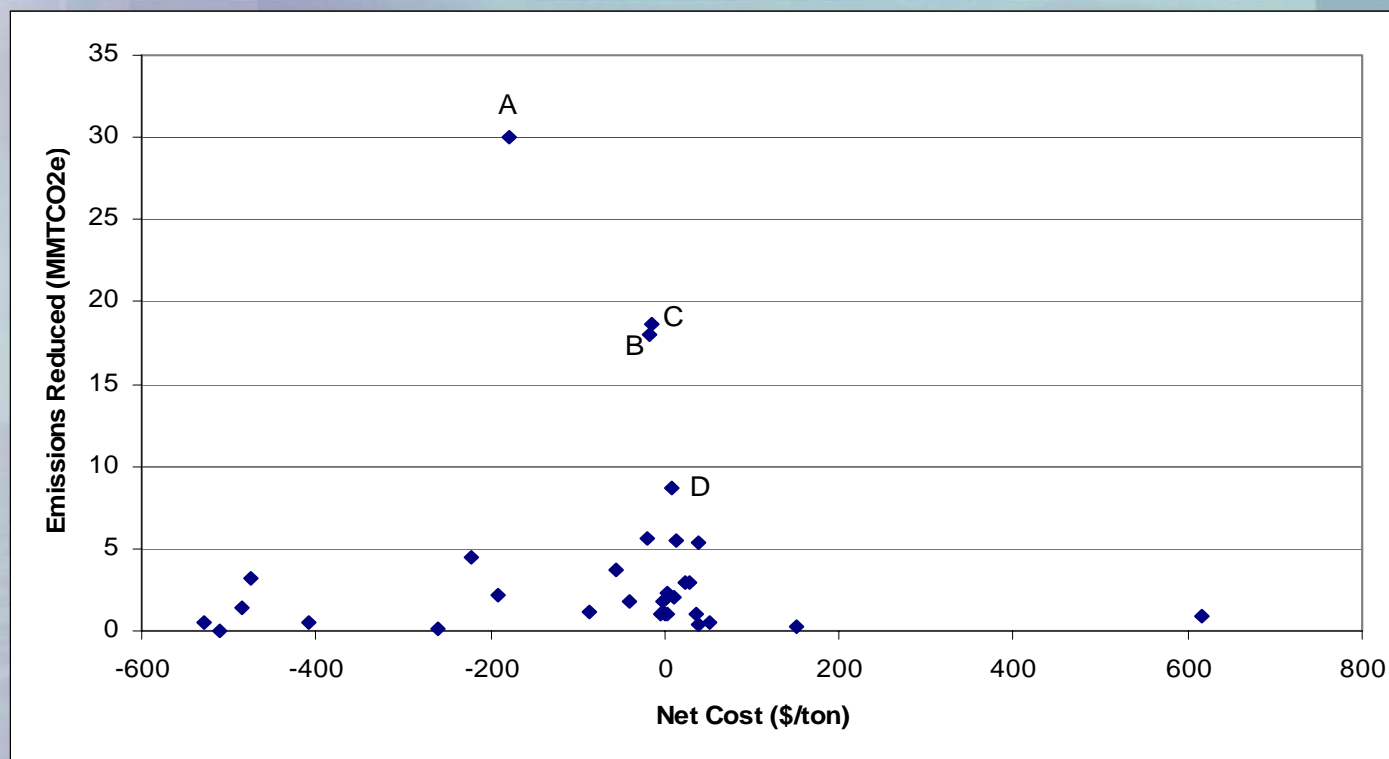
- ❑ Overall less emission reduction:
  - ❑ Lower emissions factor for avoided electricity demand
  - ❑ Revised strategies
  - ❑ Omitted strategies
  - ❑ Double counting
- ❑ Overall higher costs and higher savings.

# Results (Continued)

Agency	2006 CAT Report			This Revised Report		
	Emissions Reduced (MMT CO <sub>2</sub> e)	Costs (millions)	Savings (millions)	Emissions Reduced (MMT CO <sub>2</sub> e)	Costs (millions)	Savings (millions)
ARB	55.9	\$3,868	\$8,402	55.0	\$6,725	\$11,602
BTH	27.0	\$0	\$0	18.7	\$2,190	\$2,190
CEC	27.9	\$759	\$3,552	25.8	\$2,616	\$4,334
CPUC	36.2	\$2,499	\$4,469	15.7	\$3,667	\$3,298
DWR	1.2	\$29	\$223	0.5	\$90	\$358
Food/Ag	1.0	\$3	\$0	1.0	\$3	\$0
Forestry	33.2	\$598	\$651	6.1	\$1,632	\$1,714
IWMB	9.0	\$194	\$24	7.8	\$323	\$282
SCSA	1.8	\$0	\$0	1.8	\$559	\$559
<b>Total</b>	<b>193.2</b>	<b>\$7,951</b>	<b>\$17,322</b>	<b>132.3</b>	<b>\$17,805</b>	<b>\$24,337</b>



# Results: Net Costs



- A. Vehicle Climate Change Standard
  - B. Comprehensive Municipal Utility Program
  - C. Measures to Improve Transportation Energy Efficiency and Smart Land Use and Intelligent Transportation
  - D. HFC Reduction Strategies
- Negative values for net cost indicate that savings exceed costs.

# Results (Continued)

- ❑ The strategies remain works in progress:
  - ❑ Strategies continue to be refined
  - ❑ New strategies are being developed
- ❑ The methods remain works in progress:
  - ❑ Improved modeling tools, particularly for electricity impacts